SLOVENSKI STANDARD

SIST EN 61800-4:2004

september 2004

Električni pogonski sistemi z nastavljivo hitrostjo - 4. del: Splošne zahteve - Specifikacije naznačenih vrednosti za pogonske sisteme na izmenično napetost nad 1000 V in do 35 kV (IEC 61800-4:2002)

Adjustable speed electrical power drive systems - Part 4: General requirements - Rating specifications for a.c. power drive systems above 1000 V a.c. and not exceeding 35 kV (IEC 61800-4:2002)

ICS 29.160.30; 29.200

Referenčna številka
SIST EN 61800-4:2004(en)

EUROPEAN STANDARD **EN 61800-4**

NORME EUROPÉENNE

EUROPÄISCHE NORM January 2003

ICS 29.160.30; 29.200

English version

Adjustable speed electrical power drive systems Part 4: General requirements - Rating specifications for a.c. power drive systems above 1 000 V a.c. and not exceeding 35 kV
(IEC 61800-4:2002)

Entraînements électriques de puissance à vitesse variable
Partie 4: Exigences générales - Spécifications de dimensionnement pour systèmes d'entraînements de puissance en courant alternatif de tension supérieure à 1 000 V alternatif et ne dépassant pas 35 kV
(CEI 61800-4:2002)

Drehzahlveränderbare elektrische Antriebe
Teil 4: Allgemeine Anforderungen - Festlegungen für die Bemessung von Wechselstrom-Antriebssystemen über 1 000 V AC und höchstens 35 kV
(IEC 61800-4:2002)

This European Standard was approved by CENELEC on 2002-11-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 61800-4:2003 E

Foreword

The text of document 22G/99/FDIS, future edition 1 of IEC 61800-4, prepared by SC 22G, Semiconductor power converters for adjustable speed electric drive systems, of IEC TC 22, Power electronic systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61800-4 on 2002-11-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	dop)	2003-08-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	dow)	2005-11-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA normative and annexes A, B and C are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61800-4:2002 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60034-1 (mod)	- [1]	Rotating electrical machines Part 1: Rating and performance	EN 60034-1 + corr. February A 11	1998 [2] 2000 2002
IEC 60034-2	1972	Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)	EN 60034-2	1996
A1	1995		A1	1996
A2	1996		A2	1996
IEC 60034-2A	1974	Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles) - First supplement: Measurement of losses by the calorimetric method	EN 60034-2	1996
IEC 60034-5	- [1]	Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification	EN 60034-5	2001 [2]
IEC 60034-6	1991	Part 6: Methods of cooling (IC Code)	EN 60034-6	1993
IEC 60034-7	- [1]	Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM Code)	EN 60034-7	1993 [2]
IEC 60034-9	1997	Part 9: Noise limits	EN 60034-9	1997
IEC 60034-14	1996	Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration	EN 60034-14	1996

[1] Undated reference.

[2] Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC 60034-17	1998	Part 17: Cage induction motors when fed from converters - Application guide	-	-
IEC 60034-18-31	1992	Part 18: Functional evaluation of insulation systems - Section 31: Test procedures for form-wound windings - Thermal evaluation and classification of insulation systems used in machines up to and including 50 MVA and 15 kV	EN 60034-18-31	1994
A1	1996		A1	1996
IEC 60038 (mod)	1983	IEC standard voltages [3)]	HD 472 S1 + corr. February	1989 2002
A1	1994		-	-
A2	1997		-	-
IEC 60050-111	1996	International Electrotechnical Vocabulary (IEV) Chapter 111: Physics and chemistry	-	-
IEC 60050-151	2001	Part 151: Electrical and magnetic devices	-	-
IEC 60050-351	1998	Part 351: Automatic control	-	-
IEC 60050-441	1984	Chapter 441: Switchgear, controlgear and fuses	-	-
A1	2000		-	-
IEC 60050-551	1998	Part 551: Power electronics	-	-
IEC 60050-601	1985	Chapter 601: Generation, transmission and distribution of electricity - General	-	-
A1	1998		-	-
IEC 60076-1 (mod) A1	1993 1999	Power transformers Part 1: General	EN 60076-1 A11 A1 A12	1997 1997 2000 2002
IEC 60076-2 (mod)	1993	Part 2: Temperature rise	EN 60076-2	1997
IEC 60076-3 + Corr. December	2000 2000	Power transformers Part 3: Insulation levels, dielectric tests and external clearances in air	EN 60076-3	2001
IEC 60076-5	2000	Part 5: Ability to withstand short circuit	EN 60076-5	2000
IEC 60076-8	1997	Part 8: Application guide	-	-

3) The title of HD 472 S1 is: “Nominal voltages for low voltage public electricity sypply systems”.

Publication	Year	Title	EN/HD	Year
IEC 60146-1-1	1991	Semiconductor convertors - General requirements and line commutated convertors Part 1-1: Specifications of basic requirements	EN 60146-1-1	1993
A1	1996		A1	1997
IEC 60146-1-2	1991	Part 1-2: Application guide	-	-
IEC 60146-1-3	1991	Part 1-3: Transformers and reactors	EN 60146-1-3	1993
IEC 60146-2	1999	Part 2: Self-commutated semiconductor converters including direct d.c. converters	EN 60146-2	2000
IEC 60146-6	1992	Part 6: Application guide for the protection of semiconductor convertors against overcurrent by fuses	-	-
IEC 60204-11	2000	Safety of machinery - Electrical equipment of machines Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV	EN 60204-11	2000
IEC 60417	Series	Graphical symbols for use on equipment	EN 60417	Series
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
A1	1999		A1	2000
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. november	1996 1996
A1	2000		-	-
IEC 60721-3-1	1997	Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities - Section 1: Storage	EN 60721-3-1	1997
IEC 60721-3-2	1997	Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transportation	EN 60721-3-2	1997
IEC 60721-3-3	1994	Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weatherprotected locations	EN 60721-3-3	1995
A1	1995		-	-
A2	1996		A2	1997

Publication	Year	Title	EN/HD	Year
IEC 60726 (mod) + A1 (mod)	1982 1986	Dry-type power transformers	EN 60726	2003
IEC 61000-2-4 + corr. August	1994 1994	Electromagnetic compatibility (EMC) Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances	EN 61000-2-4	1994 [4)]
IEC 61000-4-7	1991	Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	EN 61000-4-7	1993 [5)]
IEC 61136-1 (mod)	1992	Semiconductor power convertors - Adjustable speed electric drive systems - General requirements Part 1: Rating specifications, particularly for d.c. motor drives	EN 61136-1	1995
IEC 61378-1	1997	Convertor transformers Part 1: Transformers for industrial applications	EN 61378-1 + corr. November	1998 1998
IEC 61800-2	1998	Adjustable speed electrical power drive systems Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.c. power drive systems	EN 61800-2	1998
IEC 61800-3	1996	Part 3: EMC product standard including specific test methods	EN 61800-3 A11	1996 2000
ISO 1680	1999	Acoustics - Test code for the measurement of airborne noise emitted by rotating electrical machines	EN ISO 1680	1999

4) EN 61000-2-4:1994 is superseded by EN 61000-2-4:2002, which is based on IEC 61000-2-4:2002.

5) EN 61000-4-7:1993 is superseded by EN 61000-4-7:2002, which is based on IEC 61000-4-7:2002.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
61800-4

Première édition
First edition
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Entraînements électriques de puissance à vitesse variable –

Partie 4: Exigences générales – Spécifications de dimensionnement pour systèmes d'entraînements de puissance en courant alternatif de tension supérieure à 1 000 V alternatif et ne dépassant pas 35 kV

Adjustable speed electrical power drive systems –

Part 4: General requirements – Rating specifications for a.c. power drive systems above 1 000 V a.c. and not exceeding 35 kV

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 4: General requirements – Rating specifications for a.c. power drive systems above 1 000 V a.c and not exceeding 35 kV

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61800-4 has been prepared by sub-committee 22G: Semiconductor power converters for adjustable speed electric drive systems, of IEC technical committee 22: Power electronic systems and equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
22G/99/FDIS	22G/107/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B and C are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 4: General requirements – Rating specifications for a.c. power drive systems above 1 000 V a.c and not exceeding 35 kV

1 Scope

This part of IEC 61800 applies to adjustable speed a.c. drive systems that include power conversion, control equipment and a motor. Excluded are traction for railway applications and electrical vehicle drives.

It applies to power drive systems (see figure 1) with converter voltages (line-to-line voltage), between 1 kV a.c. and 35 kV a.c., input side 50 Hz or 60 Hz, and load side frequencies up to 600 Hz. Requirements for voltages above 15 kV are not included and are defined by agreement between the manufacturer and the system supplier.

For power drive systems, with voltages above 1 kV, using a step-down input transformer and/or a step-up output transformer in connection with a low voltage converter (below 1 000 V), IEC 61800-2 applies.

EMC aspects are covered in IEC 61800-3.

Specific safety requirements for drive systems with voltage above 1 kV will be covered in IEC 61800-5.

This standard gives the characteristics of the converters, their topologies and their relationship with the complete a.c. drive system. It also states their performance requirements with respect to ratings, normal operating conditions, overload conditions, surge withstand capabilities, stability, protection, a.c. line earthing, topologies and testing. Furthermore, it deals with application guidelines, such as control strategies, torsion analysis, recommendations for earthing and drive system component integration.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-2:1972, *Rotating electrical machines – Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)*
Amendment 1 (1995)
Amendment 2 (1996)